

**MBTA – Cabot Yard Facility
Weston & Sampson Project No. 203523.A**

October 24, 2005

Mr. George Papadopoulos
US Environmental Protection Agency – Region 1
One Congress Street, Suite 1100 (CPT)
Boston, Massachusetts 02114-2023

Re: **RGP Notice of Intent**
MBTA Cabot Yard Facility
275 Dorchester Avenue
South Boston, Massachusetts

MA6910133

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Dear Sir or Madam:

Weston & Sampson Engineers, Inc. is pleased to submit this Remediation General Permit (RGP) Notice of Intent, on behalf of the Massachusetts Bay Transportation Authority (MBTA), for the above-referenced site. This NOI was prepared in general accordance with the RGP guidelines and the suggested NOI form from EPA. A portion of the flow covered under this RGP is stormwater associated with the MassPike Pump Station Number 3 and Weston & Sampson are currently pursuing coverage of this treated stormwater discharge under the existing NPDES Multisector Stormwater Permit for the Site.

Please contact the undersigned at (978) 532-1900 x2438 if you have any questions regarding this report.

Very truly yours,

WESTON & SAMPSON ENGINEERS, INC.



Frank Ricciardi, P.E.
Project Manager

cc: Debra Darby, MBTA
File

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**MASSACHUSETTS BAY
TRANSPORTATION
AUTHORITY**

**CABOT YARD FACILITY
275 DORCHESTER AVE.
SOUTH BOSTON,
MASSACHUSETTS**

**RTNs 3-3096 &
3-19247**

**USEPA REMEDIATION
GENERAL PERMIT
NOTICE OF INTENT**

OCTOBER 2005

B. Suggested Form for Notice of Intent (NOI) for the Remediation General Permit

1. General site information. Please provide the following information about the site:

a) Name of facility/site : MBTA Cabot Yard Bus Garage		Facility/site address : MBTA Cabot Yard Bus Garage	
Location of facility/site : longitude: <u>71o3'30"</u> latitude: <u>42o20'24"</u>	Facility SIC code(s): 4111	Street: 275 Dorchester Avenue	
b) Name of facility/site owner : Massachusetts Bay Transportation Authority		Town: South Boston	
Email address of owner: ddarby@mbta.com		State: MA	Zip: 02127
Telephone no. of facility/site owner: (617) 222-5000		County: Suffolk	
Fax no. of facility/site owner: (617) 222-1557		Owner is (check one): 1. Federal ____ 2. State/Tribal <input checked="" type="checkbox"/> 3. Private ____ 4. other, if so, describe: (Authority)	
Address of owner (if different from site):			
Street: 10 Park Plaza, Room 6720			
Town: Boston	State: MA	Zip: 02116	County: Suffolk
c) Legal name of operator : Massachusetts Bay Transportation Authority	Operator telephone no: (617) 222-3169		
	Operator fax no.: (617) 222-1557		Operator email: ddarby@mbta.com
Operator contact name and title: Debra Darby, Site Remediation Specialist			

Address of operator (if different from owner):		Street:	
Town:	State:	Zip:	County:

d) Check "yes" or "no" for the following:

- Has a prior NPDES permit exclusion been granted for the discharge? Yes ☒ No ☐, if "yes," number: MA-04I-002
- Has a prior NPDES application (Form 1 & 2C) ever been filed for the discharge? Yes ☐ No ☒, if "yes," date and tracking #:
- Is the discharge a "new discharge" as defined by 40 CFR 122.2? Yes ☒ No ☐
- For sites in Massachusetts, is the discharge covered under the MA Contingency Plan (MCP) and exempt from state permitting? Yes ☐ No ☒ *

<p>e) Is site/facility subject to any State permitting or other action which is causing the generation of discharge? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>If "yes," please list:</p> <ol style="list-style-type: none"> site identification # assigned by the state of NH or MA: RTN 3-3096 permit or license # assigned: RTN 3-3096 state agency contact information: name, location, and telephone number: Tim Boyle, DEP-NERO, 1 Winter St., Boston MA 617-654-6653 	<p>f) Is the site/facility covered by any other EPA permit, including:</p> <ol style="list-style-type: none"> multi-sector storm water general permit? Y <input checked="" type="checkbox"/> N <input type="checkbox"/>, if Y, number: MAR05C027 phase I or II construction storm water general permit? Y <input type="checkbox"/> N <input checked="" type="checkbox"/>, if Y, number: individual NPDES permit? Y <input type="checkbox"/> N <input checked="" type="checkbox"/>, if Y, number: any other water quality related permit? Y <input type="checkbox"/> N <input checked="" type="checkbox"/>, if Y, number:
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2. Discharge information. Please provide information about the discharge, (attaching additional sheets as needed) including:

<p>a) Describe the discharge activities for which the owner/applicant is seeking coverage:</p> <p>Discharge of treated groundwater from a groundwater remediation system to a City of Boston stormdrain/combined sewer overflow system with an outfall at the Fort Point Channel in Boston Harbor.</p>		
<p>b) Provide the following information about each discharge:</p>	<p>1) Number of discharge points:</p> <p>1</p>	<p>2) What is the maximum and average flow rate of discharge (in cubic feet per second, ft³/s)? Max. flow <u>0.28 (1)</u></p> <p>Average flow <u>100 (2)</u> Is maximum flow a design value? Y <input checked="" type="checkbox"/> N <input type="checkbox"/></p> <p>For average flow, include the units and appropriate notation if this value is a design value or estimate if not available.</p> <p>(1) Approximately 0.18 cfs of this flow is treated stormwater. Coverage of this flow under the existing NPDES multi-sector stormwater permit is currently being pursued with EPA. (2) Estimated gpm</p>
<p>3) Latitude and longitude of each discharge within 100 feet: pt.1: long. <u>71°03'30"</u> lat. <u>42°20'21"</u>; pt.2: long. _____ lat. _____; pt.3: long. _____ lat. _____; pt.4: long. _____ lat. _____; pt.5: long. _____ lat. _____; pt.6: long. _____ lat. _____; pt.7: long. _____ lat. _____; pt.8: long. _____ lat. _____; etc.</p>		

* This site is currently regulated under the MCP; however, discharge is to surface water (Fort Point Channel), requiring NPDES permit

4) If hydrostatic testing, total volume of the discharge (gals): 40,000	5) Is the discharge intermittent _____ or seasonal _____? Is discharge ongoing Yes <input checked="" type="checkbox"/> No _____?
c) Expected dates of discharge (mm/dd/yy): start 06/01/06 end 06/01/11 (estimated)	
d) Please attach a line drawing or flow schematic showing water flow through the facility including: 1. sources of intake water, 2. contributing flow from the operation, 3. treatment units, and 4. discharge points and receiving waters(s).	

Refer to attached Figure 1, Remediation System Layout and Flow Schematic.

PARAMETER	Believe Absent	Believe Present	# of Samples (1 minimum)	Type of Sample (e.g., grab)	Analytical Method Used (method #)	Minimum Level (ML) of Test Method	Maximum daily value		Avg. daily Value	
							concentration (ug/l)	mass (kg)	concentration (ug/l)	mass (kg)
25. 1,1,1 Trichloroethane	✓									
26. 1,1,2 Trichloroethane	✓									
27. Trichloroethylene	✓									
28. Vinyl Chloride	✓									
29. Acetone	✓									
30. 1,4 Dioxane	✓									
31. Total Phenols	✓									
32. Pentachlorophenol	✓									
33. Total Phthalates ⁵ (Phthalate esthers)	✓									
34. Bis (2-Ethylhexyl) Phthalate [Di-(ethylhexyl) Phthalate]	✓									
35. Total Group I Polycyclic Aromatic Hydrocarbons (PAH)		✓	<50	grab	1.1	<1 ug/l	285	NA	100	NA
a. Benzo(a) Anthracene	✓									
b. Benzo(a) Pyrene	✓									
c. Benzo(b)Fluoranthene	✓									
d. Benzo(k) Fluoranthene	✓									
e. Chrysene	✓									

⁵The sum of individual phthalate compounds.

PARAMETER	Believe Absent	Believe Present	# of Samples (1 minimum)	Type of Sample (e.g., grab)	Analytical Method Used (method #)	Minimum Level (ML) of Test Method	Maximum daily value		Average daily value	
							concentration (ug/l)	mass (kg)	concentration (ug/l)	mass (kg)
f. Dibenzo(a,h) anthracene	✓									
g. Indeno(1,2,3-cd) Pyrene	✓									
36. Total Group II Polycyclic Aromatic Hydrocarbons (PAH)	✓									
h. Acenaphthene		✓	>10	grab	1.1	<1 ug/l	1.0	NA	1.0	NA
i. Acenaphthylene	✓									
j. Anthracene	✓									
k. Benzo(ghi) Perylene	✓									
l. Fluoranthene	✓									
m. Fluorene		✓	>10	grab	1.1	<1 ug/l	1.8	NA	1.5	NA
n. Naphthalene-		✓	>50	grab	1.1	<1 ug/l	110	NA	83	NA
o. Phenanthrene	✓									
p. Pyrene	✓									
37. Total Polychlorinated Biphenyls (PCBs)	✓									
38. Antimony	✓									
39. Arsenic	✓									
40. Cadmium	✓									
41. Chromium III	✓									
42. Chromium VI	✓									

PARAMETER	Believe Absent	Believe Present	# of Samples (1 minimum)	Type of Sample (e.g., grab)	Analytical Method Used (method #)	Minimum Level (ML) of Test Method	Maximum daily value		Avg. daily value	
							concentration (ug/l)	mass (kg)	concentration (ug/l)	mass (kg)
43. Copper	✓									
44. Lead	✓									
45. Mercury	✓									
46. Nickel	✓									
47. Selenium	✓									
48. Silver	✓									
49. Zinc	✓									
50. Iron		✓	>50	grab	6010	<100 ug/l	80000	NA	4600	NA
Other (describe):	✓									

c) For discharges where **metals** are believed present, please fill out the following:

<p><i>Step 1:</i> Do any of the metals in the influent have a reasonable potential to exceed the effluent limits in Appendix III (i.e., the limits set at zero to five dilutions)? Y <u>✓</u> N <u> </u></p>	<p>If yes, which metals? Iron</p>
<p><i>Step 2:</i> For any metals which have reasonable potential to exceed the Appendix III limits, calculate the dilution factor (DF) using the formula in Part I.A.3.c) (step 2) of the NOI instructions or as determined by the State prior to the submission of this NOI. What is the dilution factor for applicable metals? Metals: <u>Iron</u></p> <p>DF: <u>>5</u></p>	<p>Look up the limit calculated at the corresponding dilution factor in Appendix IV. Do any of the metals in the influent have the potential to exceed the corresponding effluent limits in Appendix IV (i.e., is the influent concentration above the limit set at the calculated dilution factor)? Y <u>✓</u> N <u> </u> If "Yes," list which metals: Iron</p>

4. Treatment system information. Please describe the treatment system using separate sheets as necessary, including:

<p>a) A description of the treatment system, including a schematic of the proposed or existing treatment system:</p> <p>Free-phase petroleum is removed via oil/water separation. Separated water is further treated by activated carbon and the non-stormwater flow (approximately 50 gpm) will be treated for metals removal via precipitation with sodium hydroxide and sodium hypochlorite. The discharge pH will be approximately 7.8. Refer to the attached Remediation System Description and Figure 1, Remediation System Layout and Flow Schematic for further details.</p>						
b) Identify each applicable treatment unit (check all that apply):	Frac. tank	Air stripper	Oil/water separator ✓	Equalization tanks ✓	Bag filter ✓	GAC filter ✓
	Chlorination	Dechlorination	Other (please describe): Metals precipitation			
<p>c) Proposed average and maximum flow rates (gallons per minute) for the discharge and the design flow rate(s) (gallons per minute) of the treatment system: Average flow rate of discharge <u>100</u> Maximum flow rate of treatment system <u>130</u> Design flow rate of treatment system <u>130 *</u></p>						
<p>d) A description of chemical additives being used or planned to be used (attach MSDS sheets):</p> <p>Sodium hydroxide and sodium hypochlorite will be used for precipitation of metals. MSDS sheets for both chemicals are attached.</p>						

5. Receiving surface water(s). Please provide information about the receiving water(s), using separate sheets as necessary:

a) Identify the discharge pathway:	Direct _____	Within facility _____	Storm drain <u>✓</u>	River/brook _____	Wetlands _____	Other (describe):
<p>b) Provide a narrative description of the discharge pathway, including the name(s) of the receiving waters:</p> <p>Treated water will be discharged to a nearby drain manhole that discharges to a Boston Water and Sewer Commission (BWSC) combined sewer overflow conduit that ultimately discharges to the Fort Point Channel at Outfall No. CSO070.</p>						

* Approximately 80 gpm of this flow is treated stormwater. Coverage of this flow under the existing NPDES multi-sector stormwater permit for the site is currently being pursued with EPA.

<p>c) Attach a detailed map(s) indicating the site location and location of the outfall to the receiving water: See attached Figures 2A and 2B, BWSC Sewer System Maps</p> <p>1. For multiple discharges, number the discharges sequentially. See attached Figures 2A and 2B, BWSC Sewer System Maps</p> <p>2. For indirect dischargers, indicate the location of the discharge to the indirect conveyance and the discharge to surface water</p> <p>The map should also include the location and distance to the nearest sanitary sewer as well as the locus of nearby sensitive receptors (based on USGS topographical mapping), such as surface waters, drinking water supplies, and wetland areas. See attached Figure 3, Area Receptors Map</p>
<p>d) Provide the state water quality classification of the receiving water <u>SB</u>,</p>
<p>e) Provide the reported or calculated seven day-ten year low flow (7Q10) of the receiving water <u>NA</u> cfs</p> <p>Please attach any calculation sheets used to support stream flow and dilution calculations.</p>
<p>f) Is the receiving water a listed 303(d) water quality impaired or limited water? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, for which pollutant(s)?</p> <p>Pathogens and Priority Organics</p> <p>Is there a TMDL? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, for which pollutant(s)?</p>

6. Results of Consultation with Federal Services: Please provide the following information according to requirements of Part I.B.4 and Appendices II and VII.

<p>a) Are any listed threatened or endangered species, or designated critical habitat, in proximity to the discharge? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>Has any consultation with the federal services been completed? No <input checked="" type="checkbox"/> or is consultation underway? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>What were the results of the consultation with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service (check one):</p> <p>a "no jeopardy" opinion? <input type="checkbox"/> or written concurrence <input type="checkbox"/> on a finding that the discharges are not likely to adversely affect any endangered species or critical habitat?</p>
<p>b) Are any historic properties listed or eligible for listing on the National Register of Historic Places located on the facility or site or in proximity to the discharge?</p> <p>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Have any state or tribal historic preservation officer been consulted in this determination (Massachusetts only)? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p>

suspended solids passing the clarifier. Sludge from the clarifier will be thickened and passed through a filter press prior to off-site disposal.

Vapor-phase hydrocarbons will be treated with one 1,000 lb. vapor-phase GAC absorber. Dissolved-phase hydrocarbons will be treated with two 2,000-pound liquid-phase granular activated carbon (GAC) absorbers connected in series. Sample ports will be accessible to monitor system influent, midpoint and effluent.







Discharge Outfall Location

Treated water will be metered and discharged to a nearby drain manhole No.7. Drain manhole No.7 forms part of a storm drain system that discharges to a Boston Water and Sewer Commission (BWSC) combined sewer overflow (CSO) conduit that, in-turn, ultimately discharges to the Fort Point Channel at outfall No. CSO070 (refer to attached Figures 2A and 2B: BWSC Sewer System Maps)

Treatment Train #2: Forebay of Pump Station No.3

Inside the equipment building, stormwater pumped from the forebay of Pump Station No.3 will be managed with a train of process treatment equipment. The basic process equipment is shown below.

Treatment Train – Stormwater (Maximum flow 80 gpm)


 Pump Station #3			Sequestering Agent		oil-water separator		bag filter
	2-3,000lb carbon vessels		Flow meter/totalizer		discharge		

Stormwater will enter the equipment compound and be passed directly through an oil-water separator. Dissolved metals concentrations will be managed using a sequestering (chelating) agent to maintain solubility of iron and manganese through the treatment system. Suspended solids will be removed with a duplex bag filter system. Dissolved-phase hydrocarbons will be treated with two 3,000-pound liquid-phase Groundwater Activated Carbon (GAC) absorbers connected in series. Sample ports will be accessible to monitor system influent, midpoint, and effluent. The treatment system will have suitable controls and safety interlocking instrumentation to shut down flows in the event of equipment failure.

Discharge Outfall Location

Similar to Treatment Train #1, treated stormwater from Treatment Train #2 will be discharged to drain manhole No.7, and will ultimately discharge through the BWSC CSO conduit to the Fort Point Channel, as described previously. This CSO also receives the stormwater currently being pumped by MassPike from Pump Station No.3. Weston & Sampson, on behalf of the MBTA, recently applied to have this stream of treated stormwater covered under the existing NPDES Multi-Sector Stormwater Permit for the Site.

Dilution Factor Calculations

 <p>Weston & Sampson Innovative Solutions since 1899</p>	<p>PROJECT: MBTA CARBOT YARD NPDES-NOI</p>	<p>DATE: 10/21/05 BY: BJM CHKD. BY: JR</p>	<p>PAGE: 1/3</p>
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CALCULATION OF DILUTION FACTOR FOR REMEDIATION DISCHARGE IN THE FORT POINT CHANNEL (FPC)

$$\text{DILUTION FACTOR (D.F.)} = \frac{\text{Flow In } (Q_i) + \text{Flow Out } (Q_o)}{\text{Flow In } (Q_i)}$$

$$\begin{aligned}\text{Flow In } (Q_i) &= \text{MAX DISCHARGE FLOW FROM REMEDIATION SYSTEM} \\ &= 130 \text{ gpm} = \underline{0.28 \text{ cfs}}\end{aligned}$$

$$\text{Flow Out } (Q_o) = \text{FLUSHING FLOW IN THE FPC}$$

NOTE: For the purposes of this calculation, all other flows into the FPC, such as CSDs, stormdrains etc are ignored and their corresponding dilution effects are not calculated. This will give a more conservative result for the dilution factor.

GENERAL APPROACH

- Determine Flushing Flow in an assumed 100-foot mixing zone at the head of the FPC, corresponding to the location of the discharge outfall

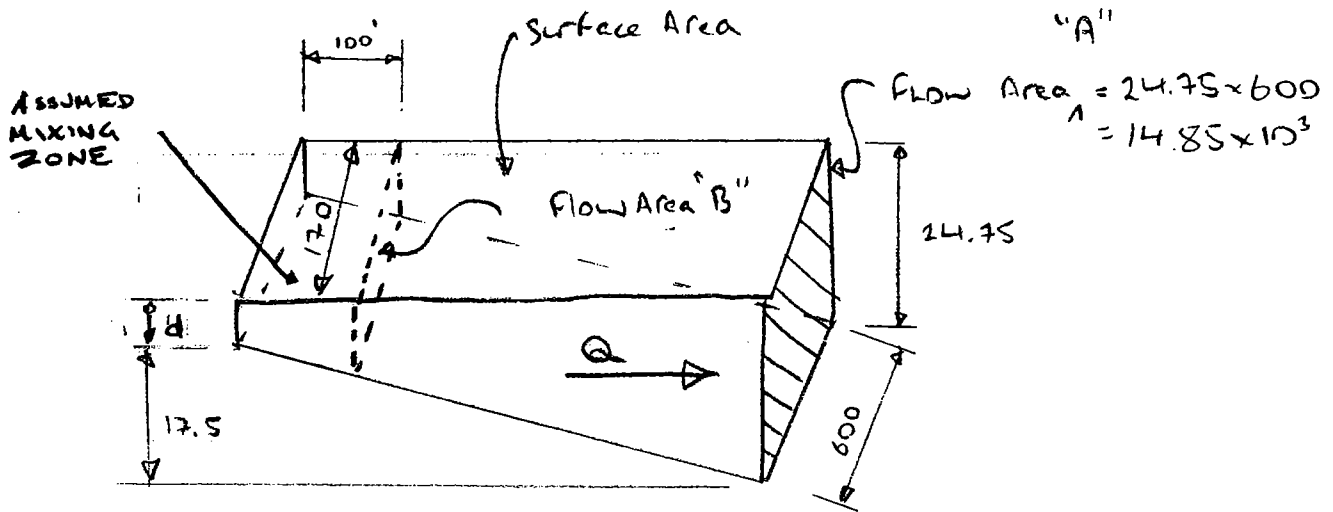
$$\text{Flushing Flow} = \frac{\text{FPC volume}}{\text{Retention time}}$$

Note:

- Dimensions for calculation of FPC volume are taken from: "Fort Point Channel Watersheet Activation Plan", 2001, Vanessa Hanger Brustlin, Inc.
- The retention time for the FPC is taken from: "The State of Boston Harbor - Mapping the Harbors Recovery", 2002, Massachusetts Water Resources Authority,

 <p>Weston & Sampson ENGINEERS, INC. Innovative Solutions since 1899</p>	PROJECT: MBTA Cabot	DATE: 10/21/05	PAGE: 2/3
		BY: BSM	
		CHKD. BY: FR	

Idealized Channel Diagram



$$d = \text{low-tide water depth} + \text{tidal fluctuation} / 2$$

$$= 2.5 + 9.5 / 2 = 7.25'$$

Calculate Flow through Flow Area A

$$Q/A \text{ Channel vol} = \text{Avg depth} \times \text{surface area}$$

$$\text{Avg Depth} = 7.25 + (17.5 / 2) = 16'$$

$$\text{Surface Area} = 2,136,750 \text{ s.f. (taken from VHB map)}$$


$$\therefore \text{Volume of channel} = 34.2 \times 10^6 \text{ cf}$$

$$\text{Retention time} = 7 \text{ days} = 604.8 \times 10^3 \text{ secs}$$

$$\therefore \text{Flow (Q)} = \frac{34.2 \times 10^6}{604.8 \times 10^3} = 56 \text{ cfs}$$

$$\text{Flow through the flow area "A" per square flow of area} = \frac{56}{14.85 \times 10^3} = \underline{0.0037 \text{ cfs/sf.}}$$

Assume constant flow throughout channel

 Weston & Sampson <small>ENGINEERS, INC.</small> <i>Innovative Solutions since 1899</i>	PROJECT: MBTA Cabot	DATE: 10/21/05	PAGE: 3/3
		BY: BSM	
		CHKD. BY: JR	

→ calculate flow through mixing zone (Flow Area B)
 → this is the flushing flow needed for calculation of D.F.
 Area of flow area B:

→ Channel slope = $\frac{\text{total channel length}}{\text{change in depth}} = 0.0031'/'$

→ ∴ depth at Flow Area B = $7.25 + 100' \times 0.0031$
 $= 7.55'$

→ ∴ Area of flow Area B = depth \times width at area B
 $= 7.55 \times 170$
 $= 1283.5 \text{ sf.}$

→ ∴ Flow through Area B = $1283.5 \text{ sf} \times 0.0037 \text{ cfs/sf}$
 $= \underline{4.75 \text{ cfs}}$

D.F. = $\frac{0.28 \text{ cfs} + 4.75 \text{ cfs}}{0.28 \text{ cfs}} = 17.96$

NAY 18

T. ...

TO EYES AND RESPIRATORY TRACT. CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.**J.T. Baker SAF-T-DATA^(tm)** Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 0 - None

Reactivity Rating: 1 - Slight

Contact Rating: 2 - Moderate

Lab Protective Equip: GOGGLES; LAB COAT

Storage Color Code: Orange (General Storage)
-----**Potential Health Effects**
-----**Inhalation:**

May cause irritation to the respiratory tract, (nose and throat); symptoms may include coughing and sore throat.

Ingestion:

May cause nausea, vomiting.

Skin Contact:

May irritate skin.

Eye Contact:

Contact may cause severe irritation and damage, especially at higher concentration.

Chronic Exposure:

A constant irritant to the eyes and throat. Low potential for sensitization after exaggerated exposure to damaged skin.

Aggravation of Pre-existing Conditions:

Persons with impaired respiratory function, or heart disorders (or disease) may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Consider oral administration of sodium thiosulfate solutions if sodium hypochlorite is ingested. Do not administer neutralizing substances since the resultant exothermic reaction could further damage tissue. Endotracheal intubation could be needed if glottic edema compromises the airway. For individuals with significant inhalation exposure, monitor arterial blood gases and chest x-ray.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard. Substance releases oxygen when heated, which may increase the severity of an existing fire. Containers may rupture from pressure build-up.

Explosion:

This solution is not considered to be an explosion hazard. Anhydrous sodium hypochlorite is very explosive.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Use water spray to cool fire-exposed containers, to dilute liquid, and control vapor.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Sodium Hypochlorite:

AIHA (WEEL) - STEL - 2 mg/m³

-OSHA Permissible Exposure Limit (PEL):

0.5 ppm (TWA), 1 ppm (STEL) as Chlorine

-ACGIH Threshold Limit Value (TLV):

1 ppm (TWA), 3 ppm (STEL) as Chlorine

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. **WARNING:** Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Colorless to yellowish liquid.

Odor:

Chlorine-like odor.

Solubility:

100% in water.

Density:

1.07 - 1.14

pH:

9 - 10 (neutral solution-no excess sodium hydroxide)

% Volatiles by volume @ 21C (70F):

ca. 95

Boiling Point:

40C (104F) Decomposes slightly

Melting Point:

-6C (21F)

Vapor Density (Air=1):

No information found.

Vapor Pressure (mm Hg):

17.5 @ 20C (68F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Slowly decomposes on contact with air. Rate increases with the concentration and temperature. Exposure to sunlight accelerates decomposition. Sodium hypochlorite becomes less toxic with age.

Hazardous Decomposition Products:

Emits toxic fumes of chlorine when heated to decomposition. Sodium oxide at high temperatures.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Ammonia (chloramine gas may evolve), amines, ammonium salts, aziridine, methanol, phenyl acetonitrile, cellulose, ethyleneimine, oxidizable metals, acids, soaps, and bisulfates.

Conditions to Avoid:

Light, heat, incompatibles.

11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure.

Investigated as a tumorigen and mutagen. Irritation data: eye, rabbit, 10 mg - Moderate

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Sodium Hypochlorite (as NaOCl) (7681-52-9)	No	No	3
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Dilute with water and flush to sewer if local ordinances allow, otherwise, whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Sodium Hypochlorite (as NaOCl) (7681-52-9)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	--Canada--		
		DSL	NDSL	Phil.
Sodium Hypochlorite (as NaOCl) (7681-52-9)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Sodium Hypochlorite (as NaOCl) (7681-52-9)	No	No	No	No
Water (7732-18-5)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8 (d)
Sodium Hypochlorite (as NaOCl) (7681-52-9)	100	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No

SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: None allocated.

Poison Schedule: S5

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 0 Reactivity: 1

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.

Label Precautions:

Avoid contact with eyes, skin and clothing.

Avoid breathing mist.

Keep container closed.

Use with adequate ventilation.

Wash thoroughly after handling.

Label First Aid:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 8.

Disclaimer:

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**BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING
FROM USE OF OR RELIANCE UPON THIS INFORMATION.**

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

FISHER SCIENTIFIC -- SODIUM HYDROXIDE, PURUM PELLETS, S318 5

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MSDS Safety Information

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MSDS Date: 12/12/1997
 MSDS Num: CJGBC
 Product ID: SODIUM HYDROXIDE, PURUM PELLETS, S318 5
 MFN: 02
 Responsible Party
 Cage: 1B464
 Name: FISHER SCIENTIFIC
 Address: 1 REAGENT LANE
 City: FAIR LAWN NJ 07410
 Info Phone Number: 201-796-7100
 Emergency Phone Number: 201-796-7100
 Resp. Party Other MSDS No.: 21300
 Chemtrec IND/Phone: (800)424-9300
 Review Ind: Y
 Published: Y

=====

Contractor Summary

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Cage: 1B464
 Name: FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
 Address: 1 REAGENT LANE
 City: FAIR LAWN NJ 07410-2802
 Phone: 201-796-7100
 Cage: SO010
 Name: NAVY ENVIRONMENTAL HEALTH CENTER
 Address: 2510 WALMER AVENUE
 City: NORFOLK VA 23513-2617
 Phone: 804-444-4657, DSN 564-4657 X 272

=====

Toxicological Information

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Toxicological Information: CARCINOGENICITY: SODIUM HYDROXIDE - NOT LISTED BY
 ACGIH, IARC, NIOSH, NTP OR OSHA. EPIDEMIOLOGY: NO INFO REPORTED.
 TERATOGENICITY: NO INFO REPORTED. REPRODUCTIVE EFFECTS: NO INFO REPORTED.
 NEUROTOXICITY: NO INFO REPORTED. MUTAGENICITY: MUTATION DATA REPORTED. OTHER
 STUDIES: NO INFO REPORTED.

=====

Ecological Information

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Ecological: ECOTOXICITY: TLM, MOSQUITO FISHS, 125 PPM/96HR (FRESH WATER); TLM,
 BLUEGILL, 88 MG/48HR (TAP WATER). ENVIRONMENTAL FATE: THIS CHEM IS NOT MOBILE
 IN SOLID FORM, ALTHOUGH IT ABSORBS MOISTURE VERY EASILY. ONCE LIQUID, SODIUM
 HYDROXIDE LEACHES RAPIDLY INTO THE SOIL, POSSIBLY CONTAMINATING WATER
 SOURCES. PHYSICAL/CHEMICAL: NO INFO FOUND. OTHER: NO INFO FOUND.

=====

MSDS Transport Information

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Transport Information: US DOT - SHIPPING NAME: SODIUM HYDROXIDE, SOLID. HAZ
 CLASS: 8. UN NUMBER: UN1823. PACKING GROUP: II. IMO - SHIPPING NAME: SODIUM
 HYDROXIDE, SOLID. HAZ CLASS: 8. UN NUMBER: 1823. PACKING GROUP: 2. IATA -
 SHIPPING NAME: SODIUM HYDROXIDE, SOLID. HAZ CLASS: 8. UN NUMBER: 1823.
 PACKING GROUP: 2. RID/ADR - SHIPPING NAME: SODIUM HYDROXIDE, SOLID. DANGEROUS
 GOODS CODE: 8(41B). UN NUMBER: 1823.

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Regulatory Information

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Sara Title III Information: SECTION 302 (RQ) CAS #1310-73-2: FINAL RQ = 1000 LBS (454 KG). SECTION 302 (TPQ) NONE OF CHEMS IN PROD HAVE TPQ. SARA CODES CAS #1310-73-2: ACUTE, REACTIVE. SECTION 313 NO CHEMS ARE REPORTABLE UNDER SECTION 313. CLEAN AIR ACT: THIS MATL DOES NOT CNTN ANY HAZ AIR POLLUTANTS. THIS MATL DOES NOT CNTN ANY CLASS 1 OZONE DEPLETORS. THIS MATL DOES NOT CNTN ANY CLASS 2 OZONE DEPLETORS. CLEAR WATER ACT: CAS #1310-73-2 IS LISTED AS HAZ SUBSTANCE UNDER CWA. NONE OF CHEMS IN PROD ARE LISTED AS PRIORITY POLLUTANTS UNDER CWA. NONE OF CHEMS IN PROD ARE LISTED AS TOX POLLUTANTS UNDER CWA.

OSHA: NONE OF CHEMS IN PROD CONSIDERED HIGHLY HAZ BY OSHA.

Federal Regulatory Information: TSCA CAS #1310-73-2 IS LISTED ON THE TSCA INVENTORY. HEALTH & SAFETY REPORTING LIST: NONE OF THE CHEMICALS IN THIS PRODUCT ARE UNDER A CHEMICAL TEST RULE. SECTION 12B: NONE OF THE CHEMICALS ARE LISTED UNDER TSCA SECTION 12B. TSCA SIGNIFICANT NEW USE RULE: NONE OF THE CHEMICALS IN THIS MATERIAL HAVE A SIGNIFICANT NEW USE UNDER TSCA.

State Regulatory Information: SODIUM HYDROXIDE CAN BE FOUND ON THE FOLLOWING STATE RIGHT TO KNOW LISTS: CALIFORNIA, NEW JERSEY, FLORIDA, PENNSYLVANIA, MINNESOTA, MASSACHUSETTS. CALIFORNIA NO SIGNIFICANT RISK LEVEL: NONE OF THE CHEMICALS IN THIS PRODUCT ARE LISTED.

=====

Other Information

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HAZCOM Label

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Product ID: SODIUM HYDROXIDE, PURUM PELLETS, S318 5

Cage: 1B464

Company Name: FISHER SCIENTIFIC CO. CHEMICAL MFG DIV

Street: 1 REAGENT LANE

City: FAIRLAWN NJ

Zipcode: 07410-2802

Health Emergency Phone: 201-796-7100

Label Required IND: Y

Date Of Label Review: 05/27/1999

Status Code: A

Origination Code: F

Chronic Hazard IND: Y

Eye Protection: YES

Skin Protection IND: YES

Signal Word: DANGER

Respiratory Protection: YES

Health Hazard: Moderate

Contact Hazard: Severe

Fire Hazard: None

Reactivity Hazard: Slight

Hazard And Precautions: GENERATES LARGE AMOUNTS OF HEAT WHEN IN CONTACT WITH WATER. ACUTE: EYE: CAUSES SEVERE EYE BURNS. SKIN: CAUSES SKIN BURNS. MAY CAUSE DEEP, PENETRATING ULCERS OF THE SKIN. INGESTION: HARMFUL IF SWALLOWED. CAUSES GASTROINTESTINAL TRACT BURNS. CAUSES SEVERE PAIN, NAUSEA, VOMITING, DIARRHEA AND SHOCK. INHALATION: IRRITATION MAY LEAD TO CHEMICAL PNEUMONITIS AND PULMONARY EDEMA. CAUSES SEVERE IRRITATION OF UPPER RESPIRATORY TRACT WITH COUGHING, BURNS, BREATHING DIFFICULTY AND POSSIBLE COMA. CHRONIC: PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE DERMATITIS. TARGET ORGANS: NONE.

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- MA Towns
- Maj. Roads Labels and Shields
- Text Town Names
- Water Supplies
 - Ground Water
 - Surface Water
 - Non Community
- Towns
- Town Arcs
- County Arcs
- Trains
- MHD Roads
 - Limited Access Highway
 - Multi-lane Hwy, not limited access
 - Other Numbered Hwy
 - Major Road - Connector
 - Minor Street or Road
- Track
- Trail
- Sub-basins
- Major Basins
- Rivers & Streams
- Solid Waste Sites
- Openspace
- ACECs
- Zone A
- IWPAs
- Zone IIs
- Sole Source Aquifers
- Lakes & Ponds
- Water
- Wetlands
- Potential Drinking Water Source Area
 - HIGH YIELD
 - MEDIUM YIELD
- Non Potential Drinking Water Source Area
 - HIGH YIELD
 - MEDIUM YIELD

Notes:
 Weston & Sampson generated this figure on May 15, 2001
 using MassGIS database data, current as of March 1999.
 NHESP data is current through 2001. Not all data is
 accurate at the mapped scale (1:18,000).

FIGURE 3
 AREA RECEPTORS MAP

MBTA Cabot Yard
 275 Dorchester Ave
 South Boston, Massachusetts

1000 0 1000 2000 3000 Feet

0.5 0 0.5 1 Miles

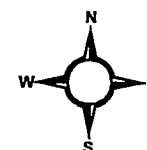




FIGURE 4
MBTA Cabot Yard Facility South Boston, Massachusetts
LOCUS MAP

SOURCE: USGS 7.5 x 15 MINUTE SERIES, MASS. QUAD, 1985

APPROX. SCALE: 1 : 12,500

0 1/2 1 MILE

Groundwater Analytical Results
MBTA - Cabot Yard Facility
South Boston, Massachusetts
RTNs 3-3096 and 3-19247
26-May-05

Parameter	Units	Well ID									MCP Applicable Standards		
		WS-31 05/26/05	SW-4 05/26/05	WS-29 05/26/05	WS-30 05/26/05	WSA-3 05/26/05	WS-27 05/26/05	SW-3 05/26/05	WS-1 05/26/05	RIZ-4 05/26/05	GW-1 (ug/l)	GW-2 (ug/l)	GW-3 (ug/l)
Volatile Petroleum Hydrocarbons													
Benzene	ug/l	<2.00	<5.00	<2.00	<2.00	<10.0	<2.00	<2.00	122	<40.0	5	2000	7000
C5-C8 Aliphatics	ug/l	<50.0	<125.0	<50.0	<50.0	<250.0	<50.0	<50.0	<500	<1000	200	1000	20000
C5-C8 Aliphatics, Adjusted	ug/l	<50.0	<125.0	<50.0	<50.0	<250.0	<50.0	<50.0	<500	<1000	400	1000	4000
C9-C10 Aromatics	ug/l	<50.0	890	<50.0	<50.0	1490	<50.0	155	1560	2910	200	5000	4000
C9-C12 Aliphatics	ug/l	92.9	1780	<50.0	65.6	2870	<50.0	294	3550	7080	400	1000	40000
C9-C12 Aliphatics, Adjusted	ug/l	89.4	812	<50.0	65.6	1050	<50.0	136	1740	4170	4000	1000	20000
Ethylbenzene	ug/l	<2.00	13.9	<2.00	<2.00	104	<2.00	3.31	100	<40.0	700	30000	4000
Methyl tert butyl ether	ug/l	10.5	<7.5	<3.00	<3.00	<15.0	<3.00	<3.00	79.9	<60.0	70	50000	50000
Naphthalene	ug/l	<10.0	89.7	<10.0	<10.0	88	<10.0	18.1	316	<200.0	20	6000	6000
Toluene	ug/l	<2.00	<5.00	<2.00	<2.00	<10.0	<2.00	<2.00	<20.0	<40.0	1000	6000	50000
o-Xylene	ug/l	<2.00	26.5	<2.00	<2.00	39.9	<2.00	<2.00	25.7	<40.0	10000	6000	50000
p/m-Xylene	ug/l	3.49	41.2	<2.00	<2.00	189	<2.00	<2.00	125	<40.0	10000	6000	50000
Total Xylenes	ug/l	3.49	67.7	<2.00	<2.00	228.9	<2.00	<2.00	150.7	<40.0	10000	6000	50000

O:\MBTA\Cabot\Tables\0505 GW Analytical.xls\0505 Master Summary

Notes:

Bold =exceeds MCP Cleanup Standard

Bold =exceeds Laboratory limit

µg/L = micrograms per liter (parts per billion)

Groundwater Analytical Results
MBTA - Cabot Yard Facility
 South Boston, Massachusetts
 RTNs 3-3096 and 3-19247
 March-April, 2002

Parameter	Units	Well ID															Cleanup Standards		
		RW-Test (10:00, 3/12)	RW-Test (15:00, 3/12)	RW-Test (19:40, 3/12)	RW-Test (01:10, 3/13)	RW-Test (09:40, 3/13)	WS-1 (09:10, 4/3)	SW-2 (11:25, 4/3)	SW-3 (13:15, 4/3)	DPE-1T-LS1 (09:30, 4/24)**	DPE-1T-LS2 (15:30, 4/24)	WS-25 LS1 (20:00, 4/24)	WS-25 LS2 (03:30, 4/25)	WS-25 LS3 (08:00, 4/25)	PS#3-Grit Ch. (10:50, 4/30)***	PS#3-Forchay MH (11:00, 4/30)	GW-2	GW-3	UCL
Field Parameters																			
Specific Conductivity	mS/cm	0.196	0.243	0.281	0.304	0.347	10.22	1.033	0.835	13.5	13.9	NA	NA	NA	NA	NA	NS	NS	NS
pH	---	5.76	6.19	6.30	6.42	6.39	6.38	7.06	6.89	6.42	7.2	NA	NA	NA	NA	NA	6.5-8.5	NS	6.5-8.5
Dissolved Oxygen	mg/L	3.07	2.51	4.65	4.43	5.20	1.55	1.56	0.34	3.6	3.80	NA	NA	NA	NA	NA	NS	NS	NS
ORP	mV	197	3	157	184	187	21.1	-97.0	-84.9	-35	-160	NA	NA	NA	NA	NA	NS	NS	NS
Temperature	degrees C	6.81	8.82	8.69	8.64	10.38	16.15	10.30	11.94	14.6	17.2	NA	NA	NA	NA	NA	NS	NS	NS
Turbidity	NTUs		NA	NA	NA	NA	-	2.76	30.3	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS
VPH																			
C ₁ -C ₄ Aliphatics	µg/L	NA	NA	NA	<100	<100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,000	4,000	100,000
C ₅ -C ₁₀ Aliphatics	µg/L	NA	NA	NA	46	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,000	20,000	100,000
C ₁ -C ₁₀ Aromatics	µg/L	NA	NA	NA	1,100	1,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,000	4,000	100,000
Target VOCs																			
Benzene	µg/L	NA	NA	NA	17	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,000	7,000	70,000
Ethylbenzene	µg/L	NA	NA	NA	4.2	3.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30,000	4,000	100,000
Methyl tert-butyl ether	µg/L	NA	NA	NA	2.3	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50,000	50,000	100,000
Naphthalene	µg/L	NA	NA	NA	170	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,000	6,000	60,000
Xylenes (Total)	µg/L	NA	NA	NA	ND	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,000	50,000	100,000
VOCs (by #260)																			
Benzene	µg/L	NA	NA	NA	14	15	NA	NA	NA	4.0	8.2	32	20	22	1.2	NA	2,000	7,000	70,000
2-Butanone	µg/L	NA	NA	NA	<10	<10	NA	NA	NA	NA	NA	NA	NA	NA	19	NA	NS	NS	NS
n-Butylbenzene	µg/L	NA	NA	NA	19	<2.0	NA	NA	NA	<1.0	6.4	<10	<10	<10	<2.0	NA	NS	NS	NS
sec-Butylbenzene	µg/L	NA	NA	NA	21	24	NA	NA	NA	12	5.6	20	14	21	<2.0	NA	NS	NS	NS
tert-Butylbenzene	µg/L	NA	NA	NA	3.0	2.8	NA	NA	NA	1.7	<1.0	<10	<10	<10	<2.0	NA	NS	NS	NS
Ethylbenzene	µg/L	NA	NA	NA	5.8	5.4	NA	NA	NA	10	7.5	130	58	110	<2.0	NA	4,000	4,000	100,000
Isopropylbenzene	µg/L	NA	NA	NA	38	43	NA	NA	NA	15	6.3	27	15	23	<2.0	NA	NS	NS	NS
4-Isopropyltoluene	µg/L	NA	NA	NA	2.8	2.5	NA	NA	NA	5.3	3.2	20	15	19	<2.0	NA	NS	NS	NS
Methyl-tert-butyl ether	µg/L	NA	NA	NA	2.8	2.5	NA	NA	NA	67	85	62	93	87	<2.0	NA	50,000	50,000	100,000
Naphthalene	µg/L	NA	NA	NA	130	150	NA	NA	NA	100	190	440	450	380	11	NA	6,000	6,000	60,000
n-Propylbenzene	µg/L	NA	NA	NA	71	82	NA	NA	NA	16	10	48	30	43	<2.0	NA	NS	NS	NS
Toluene	µg/L	NA	NA	NA	<2.0	<2.0	NA	NA	NA	<1.0	72	23	35	35	<2.0	NA	6,000	50,000	NS
1,2,4-Trimethylbenzene	µg/L	NA	NA	NA	45	49	NA	NA	NA	46	13	440	330	410	<2.0	NA	NS	NS	NS
1,3,5-Trimethylbenzene	µg/L	NA	NA	NA	7.2	6.4	NA	NA	NA	4.0	2.5	130	90	120	9.5	NA	NS	NS	NS
Total Xylenes	µg/L	NA	NA	NA	2.8	2.6	NA	NA	NA	3.6	<2.0	530	258	440	<2.0	NA	6,000	50,000	100,000
EPH																			
C ₁ -C ₁₀ Aliphatics	µg/L	NA	NA	NA	<100	<100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,000	20,000	100,000
C ₁ -C ₁₀ Aliphatics	µg/L	NA	NA	NA	<100	<100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20,000	20,000	100,000
C ₁ -C ₁₀ Aromatics	µg/L	NA	NA	NA	1,100	1,200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30,000	30,000	100,000
Target PAHs																			
Acenaphthene	µg/L	NA	NA	NA	<1.0	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	5,000	50,000
Fluorene	µg/L	NA	NA	NA	1.5	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	3,000	30,000
2-Methylnaphthalene	µg/L	NA	NA	NA	140	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10,000	3,000	100,000
Naphthalene	µg/L	NA	NA	NA	83	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,000	6,000	60,000
TPH																			
Kerosene	mg/L	NA	NA	NA	<0.05	<0.05	NA	NA	NA	NA	NA	NA	26	94	<0.053	<0.066	NS	NS	NS
Unidentified Hydrocarbons	mg/L	NA	NA	NA	2.4	2.6	NA	NA	NA	NA	NA	NA	<0.20	<0.20	1.5	1.5	NS	NS	NS
Total TPH	mg/L	NA	NA	NA	2.4	2.6	NA	NA	NA	NA	NA	NA	26	94	0.45	1.5	1,000	20,000	100,000
Metals (Total)																			
Iron	µg/L	NA	4,600	8,400	11,000	14,000	110,000	22,000	30,000	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS
Manganese	µg/L	NA	500	660	730	820	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS
Metals (Dissolved)																			
Iron	µg/L	NA	4,600	7,900	11,000	14,000	74,000	22,000	27,000	37,000	56,000	59,000	80,000	74,000	7,600****	NA	NS	NS	NS
Manganese	µg/L	NA	500	630	730	830	NA	NA	NA	15,000	17,000	23,000	16,000	16,000	1,600****	NA	NS	NS	NS
Inorganics																			
Total Dissolved Solids	mg/L	NA	NA	NA	150	190	8,200	620	450	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS
Total Suspended Solids	mg/L	NA	NA	NA	NA	NA	1,500	29	78	NA	NA	NA	NA	NA	NA	NA	NS	NS	NS
Hardness (as CaCO ₃)	mg/L	NA	NA	NA	36	36	NA	NA	NA	NA	NA	NA	1,500	1,400	620****	NA	NS	NS	NS

NOTES:

ORP = Oxidation Reduction Potential
 VPH = Volatile Petroleum Hydrocarbons
 EPH = Extractable Petroleum Hydrocarbons
 TPH = Total Petroleum Hydrocarbons
 VOCs = Volatile Organic Compounds
 UCL = Upper Concentration Limit
 µg/L = micrograms per liter (parts per billion)
 mg/L = milligrams per liter (parts per million)

ND = Not Detected
 NA = Not Analyzed
 NS = No Standard
 - = Above instrument detection range
 ** = Measured for Aromatic VOCs only (method 8260).
 *** = VOCs measured for PS#3 Grit Chamber were unpreserved & taken from TPH sample bottle
 **** = Measured May 21.
 - = Exceeds Method 1 cleanup standards

Groundwater Analytical Results

MBTA - Cabot Yard Facility
South Boston, Massachusetts
RTNs 3-3096 and 3-19247
March-April, 2002

Parameter	Units							
		RW-Test (01:10, 3/13)	RW-Test (09:40, 3/13)	WS-1 (09:10, 4/3)	SW-2 (11:25, 4/3)	SW-3 (13:15, 4/3)	DPE-1T-LS2 (15:30, 4/24)	WS-25 LS3 (08:00, 4/25)
VPH								
C ₅ -C ₈ Aliphatics	µg/L	<100	<100	NA	NA	NA	NA	NA
C ₉ -C ₁₂ Aliphatics	µg/L	46	41	NA	NA	NA	NA	NA
C ₉ -C ₁₀ Aromatics	µg/L	1,100	1,100	NA	NA	NA	NA	NA
VOCs (by 8260)								
Benzene	µg/L	14	15	NA	NA	NA	8.2	22
2-Butanone	µg/L	<10	<10	NA	NA	NA	NA	NA
n-Butylbenzene	µg/L	19	<2.0	NA	NA	NA	6.4	<10
sec-Butylbenzene	µg/L	21	24	NA	NA	NA	5.6	21
tert-Butylbenzene	µg/L	3.0	2.8	NA	NA	NA	<1.0	<10
Ethylbenzene	µg/L	5.8	5.4	NA	NA	NA	7.5	110
Isopropylbenzene	µg/L	38	43	NA	NA	NA	6.3	23
4-Isopropyltoluene	µg/L	2.8	2.5	NA	NA	NA	3.2	19
Methyl-tert-butyl ether	µg/L	2.8	2.5	NA	NA	NA	85	87
Naphthalene	µg/L	130	150	NA	NA	NA	190	380
n-Propylbenzene	µg/L	71	82	NA	NA	NA	10	43
Toluene		<2.0	<2.0	NA	NA	NA	<1.0	35
1,2,4-Trimethylbenzene	µg/L	45	49	NA	NA	NA	13	410
1,3,5-Trimethylbenzene	µg/L	7.2	6.4	NA	NA	NA	2.5	120
Total Xylenes	µg/L	2.8	2.6	NA	NA	NA	<2.0	440
EPH								
C ₉ -C ₁₈ Aliphatics	µg/L	<100	<100	NA	NA	NA	NA	NA
C ₁₉ -C ₃₆ Aliphatics	µg/L	<100	<100	NA	NA	NA	NA	NA
C ₁₁ -C ₂₂ Aromatics	µg/L	1,100	1,200	NA	NA	NA	NA	NA
Target PAHs								
Acenaphthene	µg/L	<1.0	1.0	NA	NA	NA	NA	NA
Fluorene	µg/L	1.5	1.8	NA	NA	NA	NA	NA
2-Methylnaphthalene	µg/L	140	170	NA	NA	NA	NA	NA
Naphthalene	µg/L	83	110	NA	NA	NA	NA	NA
TPH								
Kerosene	mg/L	<0.05	<0.05	NA	NA	NA	NA	94
Unidentified Hydrocarbons	mg/L	2.4	2.6	NA	NA	NA	NA	<0.20
Total TPH	mg/L	2.4	2.6	NA	NA	NA	NA	94